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NOTES ON THE SOUTH AFRICAN SOCIAL SPIDERS (*STEGODYPHUS*).

BY GUY A. K. MARSHALL, F.Z.S.

IN one of his interesting papers on the zoological features of the Transvaal (*Zool. ante*, 157), Mr. W. L. Distant makes reference to our curious little Social Spiders (*Stegodyphus gregarius*, Camb.), and perhaps a few further remarks on them may not be out of place. Mr. Distant has raised the question as to the size of the nests constructed by this species. This is of course largely dependent on the age of the colony, the structure being gradually enlarged to accommodate the increasing progeny. In the spring months I have often found single chambers, about the size of a shilling, containing a solitary female, the snare consisting of two small, irregular but closely woven screens diverging on either side of the chamber. From this simple structure a graduated series may be traced up to the fully developed nest. I have seen many hundreds of these nests both in Natal and Mashonaland, and, so far as my experience goes, I should say that the one reproduced in Mr. Distant's excellent photograph is well below the average of a fully developed nest, which I should estimate to be at least twice the size, though they are sometimes notably larger. In this country there is a larger and paler species of the same genus, which I do not remember to have met with in Natal, and its nests are often built on a still larger scale, attaining the size of a man's head.

The nest itself is composed of a compact mass of closely felted glutinous silk traversed irregularly throughout with tubular passages, sometimes terminating in small chambers. In these latter the egg cocoons are often placed, but by no means always, for there seems to be no organised nursery, as with the social Hymenoptera. The surrounding foliage is worked in with the nest (but I doubt whether this is for protective purposes), the exterior being overlaid with a coating of very adhesive silk, which is likewise used for making the snares, these being highly irregular both in size and shape, but usually taking the form of vertical screens.

I may here digress to express my belief that the nests of some of our Sunbirds, viz. *Cinnyris gutturalis*, L., *C. chalybeus*, L., *Anthodæta collaris*, V., &c., are built expressly to resemble the nests of *Stegodyphus* for protective purposes. I have watched the construction in the case of these three species, and the nests are all built in a practically similar manner. No attempt is made at concealment, and they hang suspended from the outermost twigs of bushes or low trees at no great distance from the ground—positions which are equally affected by the Social Spider. The ground work of the dome-shaped nest with its small porch is composed of interwoven grass, and the exterior is covered with leaves, twigs, &c., bound on with cobwebs, the structure when finished having a generally unkempt appearance eminently suggestive of the abode of *Stegodyphus*; and indeed I have been deceived myself in this respect more than once. I have observed *A. collaris* and *C. chalybeus* collecting web from the snares of the large *Nephile* Spiders in Natal; but a pair of *C. gutturalis*, which built within a few feet of the door of one of my huts on the Umfali river, used only the web of *Stegodyphus*.

The food of the Social Spiders consists principally of Coleoptera, for the capture of which their strong glutinous snares are admirably adapted. Their chief victims are the Melolonthidæ, such as *Anomala*, *Trochalus*, *Adoretus*, &c., which positively swarm round trees and bushes on the warm spring evenings after the early rains. Among the larger diurnal beetles, the handsome Buprestids of the genus *Psiloptera* fall a frequent prey to their wiles, and it seems strange how such securely armour-plated insects can afford sustenance to the weak little Spiders; especially



when one thinks that an intelligent insect like the Bee is apparently unable to find a weak spot in the less efficient armour of the Cetoniid *Hoplostomus fuligineus*, Ol., when it enters her hive to rifle the honey. But it would take quite a long list to enumerate all the species of Coleoptera which I have found dead in the nests of these rapacious creatures, for in truth "all is fish that comes to their net," even though it be the evil-smelling *Lycus* or the caustic *Mylabris*. To illustrate the strength of the silk, I might mention the capture of such powerful Beetles as *Copris*, *Catharsius*, and the large *Bolboceras panza*, Pér.; moreover, our large Migratory Locust (*Acridium purpuriferum*, Walk.) is, I am pleased to say, occasionally to be found in the larder, and anyone who has received a kick on the finger from the spiny leg of this objectionable insect will realise that it would take something pretty strong in the way of Spider's silk to secure him.

At one time I had thought these Spiders never entirely nocturnal in their habits, and so far as the construction of their snares is concerned they are no doubt crepuscular, like most Spiders of procryptic colouring. But I find they are by no means loth to emerge in broad daylight to capture their prey; and when a luckless Beetle becomes enmeshed, two or three rapidly rush out and tackle it, keeping as much beneath it as possible, apparently to prevent any attack from above. Should the insect be too large for them, other Spiders come out to assist, and it is hauled off with all speed under shelter, no attempt being made to bind it up in any way as the geometric Spiders do. Judging by the position of the dead bodies of their prey, it is probable that at night many are devoured *in situ*, but even then the majority must be carried inside the nest.

The eggs are usually laid about February or March, being placed in small flat circular cocoons of a yellow colour. The young Spiders are much more rotund in appearance than their parents, and of a yellow colour. In the early winter the nests may be noticed to fall considerably into disrepair, and the damaged snares are no longer mended, and eventually disappear. On investigation I found this to be due to the fact that about this time the older generation dies off entirely, the nests then being found to contain only young Spiders. The dead bodies of

the parents may be seen lying about in the passages amidst the *débris* of deceased Beetles. Whether the older Spiders are actually killed and devoured by their own progeny, I have not so far sufficient evidence to decide. For the present, however, I incline to this view, for otherwise I can see no reason why the parents should suddenly die off as they appear to do. It is true that at this period their food supply almost comes to a standstill, for during the winter months Coleoptera cease almost entirely to venture out on the wing; but this would affect the young ones equally, if not more. Even if this supposition be correct, it is difficult to understand how the young subsist through the winter, for, so far as I have seen, they do not emerge at all from the nest, and they certainly construct no snares during that season for the capture of insects.

One of the most interesting features in the economy of these creatures has yet to be dealt with. In the winter of 1895 I examined a number of deserted nests along the Umfali river in hopes of finding Coleoptera harbouring therein, and I was surprised to find in several instances large balls of grass, wild cotton, or even feathers, right in the middle of the nest. I was quite at a loss to understand how or why the Spiders should accumulate these materials, and I did not find the solution until early in the present year.

It happened thus. On one of my entomological rambles some miles from Salisbury, I found myself suddenly enveloped in a regular winding-sheet of sticky Spiders' silk, which was evidently that of my friend *Stegodyphus*. I therefore walked a short distance up wind to find whence it came, and soon descried a bush on a termite heap, on the summit of which were some hundreds of these Spiders, apparently engaged in constructing a new nest, and evidently in a great state of perturbation. It at once struck me as very curious that these wary creatures should be thus exposing themselves wholesale in broad daylight, and I therefore proceeded to search for the disturbing element. The bush was placed on the side of the termite heap, and was connected by several strands of about four feet long with a bush on the top, on which was a smaller lot of some fifty Spiders. These were again connected with another shrub about six feet away on the far side of the ant heap. Here was found the original nest, and there

were still one or two Spiders on the outside of it. Within a foot of the nest was an open bird's nest, apparently that of a finch, containing two eggs, with which, however, I was unacquainted, they being very similar in appearance to those of the European Bullfinch. It seemed hardly probable that this could be the cause of the commotion, and so it proved, for the eggs were clearly deserted, being quite cold and hard set. I then examined the Spiders' nest, and was surprised to hear sundry squeaks inside, so, placing my butterfly-net beneath it, I tore the nest open, and out dropped four little Dormice (*Myoxus nanus*, De Wint.). Here, then, was the cause of this twofold domestic tragedy! Here, too, was the explanation of the facts I had observed on the Umfali, for in the centre of the nest was a chamber lined with soft grassheads, feathery flower-seeds, and one or two feathers. Subsequent observation has convinced me that this is a normal habit on the part of the Mashona Dormouse, for I have since found two full-grown specimens in similar positions, and, besides, a large proportion of disused nests show clear signs of having been thus occupied. I expect the primary attraction will be found to be the Beetles caught in the Spiders' web, the Dormice having gradually learnt to utilise these snares for their own purposes, and finally evicting the inhabitants. Whether they usually occupy deserted nests, or themselves oust the lawful proprietors, cannot yet be decided for certain; but the above instance clearly demonstrates that the latter method is sometimes employed, and from the evidence before me I am inclined to believe that this is the usual course. It is pretty clear that in this case the mother Dormouse must have brought her young to the nest, for they were fully a week old, and perhaps more, and the condition of the nest showed that it had been occupied only for a short time. Likewise it seems probable that the Spiders resisted the invasion for some time, as it was evident that they could only have evacuated a few hours before, whereas it must have taken the Dormouse some little time to construct her nest and bring her young there.

To return to the victims—they were busying themselves all this while in setting their house in order, though a large proportion were apparently of opinion that it was desirable to put a still greater distance between them and their persecutors; for

some fifty of them were standing together with abdomen in air pouring forth a regular stream of silk in hopes of connecting with another tree. In one case a few threads caught on to a tree fully twelve feet away; the near ends were then promptly fastened down, and a Spider would advance cautiously along, strengthening the thread and hauling in the slack as she went, but in every case the thread broke. After many attempts to thus retreat further they gave it up, and went on with the work of making a new nest. The foundations of this were made by forming a dome-shaped canopy some eighteen inches in diameter over the top of the bush, the Spiders running backwards and forwards in all directions laying down the silk. I presume that eventually the edges of this canopy would be drawn together to form the outer shell of the nest, but unfortunately I was unable to remain longer to watch the process, and as I never found an opportunity to revisit the spot, I never learnt the sequel of this interesting chapter in the life-history of *Stegodyphus*.

In conclusion, I may mention that I have recently discovered a singular messmate of the Social Spiders. This is none other than one of the Micro-Lepidoptera! The larvæ in their frass-covered cases reside among the *débris* of dead insects, on which I presume they feed. I have not yet reared the imago, but hope to do so before long. In a nest I opened yesterday I found six empty pupa-cases, from which the moths had evidently emerged; how they managed to escape right from the heart of the nest seems little short of a marvel. Truly these venturesome insects pass their lives in the very jaws of death, and the struggle for existence must be keen indeed to compel them to resort to such an abode.

ZOOLOGICAL NOMENCLATURE.

REMARKS ON THE PROPOSED INTERNATIONAL CODE.

BY REV. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S.

MANY of the proposals of the International Commission* on this subject are so admirably drawn that they have a fair chance of commanding universal acceptance. On some of them public opinion is authorized to differ, since the members of the Commission are themselves not unanimous. By a singular policy at Cambridge the Report was submitted to the Zoological Congress, and in the same breath withdrawn from discussion. Debate was closed before it had begun. This tantalizing course was due apparently to some dread of starting an interminable controversy. It is easy no doubt to have too much of a good thing, but nothing is an unintellectual alternative to too much.

The proposals are divided into rules and recommendations. Nevertheless several recommendations are interpolated among the rules.

On the eighth rule of section I. the members of the Commission are divided. Three of them say, "All grammatical errors must be corrected; at the same time hybrid names are to be retained without emendation." For example, they "correct" *Cuterebra* to *Cutiterebra*, *Glossiphonia* to *Glossosiphonia*. But two of the members propose the following form for this rule: "Barbarisms and solecisms shall be construed (under B. § 3 k) as arbitrary combinations of letters, and cannot be rejected or emended because of faulty construction. Hybrid names are to be avoided, but when once published are not to be rejected."

The minority, it will be seen, include in their rule a recommendation. Apart from that, theirs is by far the more desirable

* See the 'Annals and Magazine of Natural History,' ser. 7, vol. ii. p. 181 (1898), and the Report submitted to the International Zoological Congress at Cambridge last August.

form. It should surely be the object of an International Code to interfere with individual liberty as little as possible, and to protect accepted names from any change that can be avoided. But in correcting names which may be considered to offend against grammar or philology, more inconvenience than advantage is likely to arise. A longer name, as in the examples quoted, will often have to be substituted for a shorter one. The practical nuisance of this will be well understood by those who have to write labels for small bottles and glass slips. It is also contrary to the tendency of language, which is constantly condensing instead of expanding its forms—reducing, for instance, the five syllables of "*Mea domina*" to the monosyllabic "Ma'am," or "Mum," or "M'm." The zoologist need not encourage the geographer to change back Brighton into Brighthelmstone. By correction a name will sometimes receive a different initial, as in the change of *Oplophorus* to *Hoplophorus* or of *Upogebia* to *Hypogebia*, which is apt to be very confusing when an index has to be consulted. The principle of priority is weakened when the original form of a name is relinquished not in the interests of science, but of scholarship. On the other hand, it is so easy to let the names alone, carrying with them their small but interesting touches of autobiography, and no possible harm is done if we do leave to the polished scholar some little occasion for chuckling over us untutored sons of science.

In section III., the second rule begins by declaring that "Specific names are of three kinds: a. Adjectives which must agree grammatically with the generic name." On this it may be diffidently asked whether it would not be simpler to regard all generic names in zoology as masculine? This would avoid any necessity for changing the termination of a specific name on its transfer from one genus to another. It would put an end to a frequent confusion arising between Latin feminine and Greek neuter forms which happen to have the same vowel-ending. The most sensitive ear need not be offended, since *Agricola*, *Aurelia*, *Cyphostoma*, under the present rule, require an adjective respectively in the masculine, the feminine, the neuter. An animal does not become more one gender than another because of its name, and the grammar of the Greeks has wisely recognized what is called "the construction according to the sense."

The third kind of specific names is said to be: "c. Substantives in the genitive, such as those given in dedication to persons or groups of persons." To this is appended the remark, "The genitive is formed by adding an *i* to the exact name of the person, if a man; an *æ* in case the person is a woman." Without further explanation, therefore, we might have two such species as *Felis Johnsoni* and *Felis Johnsonæ*. But this can scarcely be intended.

The third rule of this section, according to three members of the Commission, should read thus: "While it is desirable to avoid the repetition of the generic name as a specific name (*Perdix perdix*, *Trutta trutta*), such repetition is not sufficient grounds for rejecting or changing either the generic or the specific name. The same principle applies to the repetition of the specific name as subspecific or varietal name." The minority say, "Specific names, when used as generic, must be changed."

The following form is offered as an alternative: In future, specific names within a genus may not be used for naming its subdivisions; as regards the past, the name of the species which has supplied a generic name shall be that which was given to it by the author who placed it in the new genus to which its specific name was applied. For example, if *Tetrao perdix*, Linn., at the institution of the genus *Perdix* had been called *Perdix perdix*, that would be the name to be retained; but as it was in fact called *Perdix cinerea*, the very name used by Aldrovandi and other pre-Linnean authors, that name will happily prevail. This rule, if accepted, will keep us from tinkering at the work of our predecessors by *ex post facto* regulations.

In section IV., rule 3 finds the Commission once more divided, on the question of defining who is the author of a species. For the paragraph in dispute, the following form is suggested:—The author of a species shall be that person who—*a*. First publishes the description of the species, with names in conformity with Rule 1. Should the description and names be at first publication incorporated in the work of another writer, such writer will himself be deemed author of the species unless he attests that he is quoting the description as well as the names from another authority. Paragraphs *b*, *c*, *d* would follow as in the proposal of the majority.

On the one hand, the man who has had the trouble of examining and describing a species has much more right to be regarded as the "author" than one who has merely suggested a name. On the other hand, an author should not be deprived of his credit because his work happens to be incorporated in another man's publication. The majority of the Commission append a recommendation—for it can scarcely be intended for a rule—that the name of the author should follow the specific name "without the interposition of a comma." There is nothing to be said against this except that sometimes an author's name may come into a ludicrous combination with an uncomplimentary remark intended for the Snake, or the Cockroach, or some other low-minded species. Another recommendation, posing as a rule, prescribes the use of italics for distinguishing between the names of the species and the name of the author. It would be better to proscribe italics than to prescribe them. They are less legible than many other forms of type, and, as old books show, they are the worst in wear.

Coming now to the recommendations, specified as such, the third deals at great length with words which may be taken as generic names, and mentions first: "a. Greek substantives, for which the rules of Latin transcription should be followed." Many examples are given.

In regard to transcription, a word may be said in behalf of the English-speaking peoples. Our pronunciation vividly accentuates the difference between a long vowel and a short one, yet we have but one symbol for both sounds throughout our vowel system. There is nothing in the form of the letters to prevent a man's saying *Amphibōla*, *Hydrophilus*, or *Hippopotāmus*. How much the young have suffered through false quantities is an untold sum of human misery. But they harass not boys alone. Of university men who acted classical plays in his day, Milton says bluntly, "They mispronounced, and I disliked; and, to make up the atticism, they were out, and I hissed." The men he derided were victims to tortures of the tongue, which, as far as speakers are concerned, "The bad affright, afflict the best." Long ago an absurdly simple remedy was proposed for application to scientific names. It directed that the penultimate syllable of a name should be accented when that syllable is long,

and the ante-penultimate when the penultimate is short. The International Commission would do a thankworthy act by giving the sanction of their authority to this ancient but much neglected proposal.

In the transcription of Greek diphthongs it would, as many think, be far better to retain ei, ai, and oi; ei because there at least the quantity could no longer be doubtful, but ai and oi because the italic printing of α and α causes constant confusion. Thus, for example, $\mu\alpha\iota\mu\alpha$, the bright sparkle, is confounded with $\mu\text{o}\iota\mu\alpha$, gloomy fate. Pareiasaurus, the lizard with a cheek, is a complete linguistic puzzle when written Pariasaurus. The ending ide , in names of zoological families, is often pronounced with a long penultimate, as if from the Greek $\varepsilon\delta\eta\varsigma$, as in Atreides. But here a misconception has evidently crept in. The penultimate is only long in such words as Atreides because it is a contraction of two short syllables into one long one. In $\mathcal{A}\text{eacides}$ from $\mathcal{A}\text{eacus}$ and in similar forms the penultimate is short. But knowledge of what is right, and uniformity in usage can never become general until in these matters we are assisted by the art of the printer.

Among consonants the transcription of k into c appears very undesirable, as it inevitably results in mispronunciation, $\chi\alpha\phi\chi\iota\text{vo}\varsigma$, for instance, being changed vocally into Carsinus.

Some minor points of criticism may be left over to a future opportunity. But, before concluding, I shall venture to submit one or two questions to the learned authors of these recommendations. Is it quite fair to expect those whom they will concern in all parts of the world to be acquainted either with "the rules adopted by the Geographical Society of Paris," or with the geography of the Romans and of Latin writers of the Middle Ages? Why, too, should any notice be taken, in so important a document, of the trivial economy aimed at in abbreviations of authors' names? These absurd curtailments remind one of the time when the sayings and doings of Pitt and Fox were recorded as the words and deeds of Mr. P-tt and Mr. F-x, and when "the" was "y^e," with other teasing stinginesses in printing. In the interests of this useless system the zoologist is invited to carry about a list of abbreviations proposed in one country, enlarged in another, imperfect at its birth, and with

every year of its existence bound to become more so, and this, forsooth, in order that the printer may make Lesson Less., make A. Müll. of Auguste Müller, turn Sowerby into Sow., and make Stingelin Sting.

As illustrating the difficulty of the whole subject, it is interesting to note that the five distinguished men on the Commission failed to come to an agreement on three topics, and that on each occasion the majority was differently composed.

NOTES AND QUERIES.

MAMMALIA.

The Mammalia of Hampshire.—I am collecting information concerning the Mammalia of Hampshire, and should be grateful to any of your correspondents who could help me, especially with regard to the Bats, of which we claim eleven species, and the Cetacea (eight species), the Polecat, Marten, Black Rat, and Roe-buck.—J. E. KELSALL (Milton Rectory, Lymington).

AVES.

Swallow v. Flycatcher's Peculiar Nesting Site.—Whilst searching a certain portion of the Mendip Hills for eggs of the Corn Bunting on June 20th last, I chanced to pass close to one of the well-like excavations which are numerous in this particular locality, and perhaps date back to 1500, when these hills were searched for lead, &c. On walking round this circular excavation in the earth, edged entirely with tall bracken, I was surprised to see a Swallow (*Hirundo rustica*) fly up from the depths below; so, having procured from the near woods a long stout fir-pole, I slid one end down, and firmly ledged it on an opposite rock. After half an hour's steady and laborious work in 100° Fahr., I found myself eighteen feet below the surface, and not altogether in an agreeable position or condition. After closely examining my landing stage, I commenced a hasty search for the nest of my little friend the Swallow; I found it close in reach, perhaps fourteen feet from the top, fixed against the rock, and built in the ordinary way of mud, and lined with hay and feathers, and containing five young ones. The nest appeared to be one of former years, only freshly lined. Personally, I have never found a Swallow's nest in such a queer situation before. On July 19th, having to visit a Greater Spotted Woodpecker's nest close by, I again walked to the gruff-hole; getting my pole once more into position, I was much quicker at the bottom of it than on the previous occasion. Now for the surprise: a little brown bird was sitting on the Swallow's nest. I reached my hand towards her, and she disappeared out of the hole above; I immediately recognized the Spotted Flycatcher. A pair of these birds had evidently taken possession of the Swallow's nest,

and built a compact little nest inside, containing four eggs of the ordinary colour. The young of this species have since flown.—STANLEY LEWIS (Mount Pleasant, Wells, Somerset).

A Cuckoo's Economy in Question.—Ornithologists of a speculative turn of mind may be interested to learn that during the last week of May, in 1896, I found a Meadow Pipit's (*Anthus pratensis*) nest on the lower slopes of Aran, a well-known mountain in North Wales. In addition to one solitary egg belonging to the lawful owners, the nest contained a Cuckoo's egg. The former I left *in situ*; the latter I appropriated for reasons which need not here be specified, despite the fact that egg-collecting then as a hobby was with me a thing of the past. On retracing my steps some six hours later, I turned aside to have another look at the nest in question, and was surprised to find that the Meadow Pipit's egg had been hatched in the interim, the callow youngster lying dead in the nest. I say "surprised" advisedly, for though I had not examined the commoner egg at all critically in the morning, I had nevertheless satisfied myself before abstracting it that the Cuckoo's egg was absolutely fresh, and such was subsequently proved to be the case.

Now the main points of interest are as follows: What agency had been instrumental in removing the other eggs, which it is quite legitimate to assume had been originally laid? A Meadow Pipit's almost invariable clutch, I may observe, is four to six; *not one odd egg*. Again, admitting for the sake of argument that sundry eggs had been removed, what was the motive underlying their removal, assuming the Cuckoo to have been the culprit? Oologists of experience will not need to be told that when Voles plunder little birds' nests, they usually make a clean sweep—in time and by degrees—of all the eggs; while there are but few birds which will allow themselves to be robbed of every egg but one, yet still continue sitting, and to this category, in my experience, Meadow Pipits do certainly not belong. Another interesting point, too, is this: a perfectly fresh Cuckoo's egg is found side by side with a Meadow Pipit's egg on the point of hatching; what then becomes of the alleged prescience, or intelligence, or instinct, or inherited memory on the part of the Cuckoo in always arranging things so adroitly that no hitch shall occur in the due incubation of its eggs if left unmolested by the foster-parents? For in this particular instance, had there been no interference on my part, the young Meadow Pipit, in the event of all having gone well with it, would have been fledged and away before the Cuckoo's egg was hatched, even supposing the foster-parent to have "sat" pretty assiduously—which I doubt—after its own young one had emerged from the shell!

Howsoever the facts are to be accounted for, I do not disguise my personal conviction that the Cuckoo herself abstracted the surplus eggs of the

Meadow Pipit, and that she had some excellent though recondite motive for so doing. To others I leave the responsibility of explaining away an apparently singular aberration on the part of a species which, according to some people, is "knowing" even to the extent of being able to diversify the colouring of its eggs to suit the exigencies of each recurring situation! But, apart from all speculation on the issues raised, it is impossible not to recognize that the discovery of a perfectly fresh Cuckoo's egg alongside a Meadow Pipit's egg on the very point of hatching must be a matter of no small interest to scientific ornithologists, since, so far as I am aware, nothing of the kind has ever been before recorded; while far from tending to elucidate anything in connection with the economy of the species, the incident, if not to be dismissed as a *lapsus* on the part of an undiscerning Cuckoo, seems to me to involve a most perplexing economy in still deeper mystery.—H. S. DAVENPORT (Melton Mowbray).

Cuckoos in 1898.—It seems clear that some peculiarity exists at the present time here connected with calls upon the services of the Mountain Linnet (*Linota flavirostris*) as foster-birds. Following up my observations since my last communication, I observed another young Cuckoo on an adjoining moor on July 30th. I was attracted to it by the peculiar "cheep" of this young bird, which of course was away from the nest. Its entreaties were evidently directed towards its foster-parents, and on changing its position from the sloping ground where it was when it first saw me to the branch of a willow bush, where it clung tenaciously, the Mountain Linnets were both promptly in attendance. We may assume that they were the foster-birds, and their interest in the young Cuckoo was equal to anything which I have observed by these birds in that direction when looking after their own young after these have left the nest. These three were seen near the same place in similar form on Aug. 8th. Another young one made its appearance on my hay-field on Aug. 6th; the peculiar "cheep" drew attention to it, and it seemed to have just recently taken to flight. It was not the rufous one mentioned in my last communication, being of a dark blue colour. This bird may be thus considered another of this year, and had the same species of birds for foster-parents. As hay-making operations were being executed at the time, ample opportunities occurred for observing the movements of this individual, which was seen daily up to Aug. 12th; sometimes being under cover, sometimes appearing in graceful flight, perching on an adjoining bush, the fences of the field, or on the implements. It seemed to become acquainted with our movements, and it occurred to me that the nature of the flies and such like was the attraction which kept this one so closely amongst us. We neither saw it taking food itself, nor being fed by the foster-parents, but the latter were always in attendance; and a

peculiar sight it was to see this pretty specimen of a bird courting care from the little Twites. One could not wish to see a better sight than the graceful form of its flight during the latter part of the time. It improved in flying during the week. A Kestrel soaring nearly caused some little hubbub on one occasion, the Cuckoo's cries, evidently showing that it wanted protection from its little guardians, drawing our attention to the matter, which was interesting to us. The last appearance of this bird was on Aug. 15th, by which time the peculiar "cheep" of its voice had changed to a sort of croak. It had become a beautiful specimen of its kind, and attained the power of a most graceful flight. The foster-birds were still in attendance. Three were seen on a moor in the neighbourhood on Aug. 12th. One being seemingly larger than the others, there were some grounds for supposing that the former was an old one, the latter young ones. That is all that I know as to the latest date of their presence or waygoing. The season being late, they would probably have been here at a later date than usual; their departure being a mystery to me. Whether the young have instinctive powers to lead them the proper course of themselves, or the old wait in whole or in part—that is, parents wait on offspring, or casual stragglers pick up young right and left—this year at least the old birds had generally disappeared before these young ones referred to were able to follow. How far they may go at first is also worthy of notice, as they may only remove in stages of a few miles at a time from this part, seeing that they appear much later in the milder parts of the kingdom. Then, as they do not pair, as is believed, would the males move away before the females? The latter might be kept waiting for or with their young, but—and as others who are polygamous have males which show more or less interest in the offspring of their species—we cannot conclude that the males do not equal in interest the females. In short, the point being debated whether the old take any interest after depositing the egg, it is just possible that the males would equal the females in showing attention, which latter has been proved to have been shown to young at various times. When the attachment continues so long towards the foster-birds, it would be interesting to know how they parted company. Would the youngster by a long flight leave behind such foster-birds as those we have been speaking of, who live in small space, or would the latter shake the former off in due time? There is also the point, would one of the old Cuckoos appear in due course, or is the whole thing a matter of mere accident?

Then I have to say about the clearing away of the eggs or young of the foster-birds. In the two cases this year it is pretty clear that neither was done by the young Cuckoos—one being impossible, the other most improbable. It must have been either the old Cuckoo or the foster-birds that had cleared away the young in one case, the eggs in another, to make room

for the favoured one. I for one must lead myself on to the debatable ground, and say that the vigilant eye of the parent Cuckoo, in my opinion, must have led her to clear out the impediments to the proper care of her progeny. It being concluded that the Cuckoo about the time which she deposits an egg in a nest habitually does extract an egg of the bird's, but not always, we may reason that she may more or less habitually clear out the latter's offspring. Failing in the latter, the young Cuckoo can do so for itself in due course. Whether dead young birds would be carried away by her is more doubtful; probably, as in some cases at least where the young one expels, the foster-birds clear away.—WM. WILSON (Alford, Aberdeen).

Date of Arrival of the House Martin.—I am glad that Mr. Warde Fowler has called attention (*ante*, p. 267) to the apparent alteration in the date of arrival of the House Martin (*Chelidon urbica*), as it has much puzzled me to account for its having been so late in its spring appearance in South Devon since 1891. Previous to that year I had always seen the first House Martin in April, and in the year before that (1890) as early as the 9th of that month. Since then I have never observed it before May, except in 1894, when April 20th was the date of its arrival at Exmouth. Although in 1891 I did not see any in Exeter till May 14th (when there were a few only to be seen), it was observed at Swanage, in Dorset, on April 11th, and at Kingsbridge, in South Devon, on April 24th. Again, in 1897 I did not notice any at Chagford, Devon, till May 3rd; but House Martins had been seen by the Rev. Murray A. Mathew at Buckland Dinham, Somerset, on April 6th. This year I saw none till June 19th at Topsham, and at Chagford, at the end of the month, there were very few in the streets, though it is usually a very abundant species there. One, however, was seen by Mr. Mathew at Buckland Dinham on April 26th, and it appears to have been as numerous as usual there. In this neighbourhood it has been very scarce all the summer. It would appear from the late Mr. T. R. Archer Briggs's notes that the House Martin is always later in arriving in the Plymouth district than about Exeter, and the late Mr. J. Gatcombe observed some arriving with a northerly wind on May 3rd, 1873, although near Topsham it arrived in large numbers from the south on April 16th. In 'The Zoologist' for 1845, pp. 1189 and 1890, are some observations on the arrival of spring migrants at Devonport by W. Harris Row, who gives the following dates of arrival for the House Martin:—1841, May 3rd; 1842, May 9th; 1844, May 2nd; 1845, May 5th. In 1895 I observed House Martins at Bovey Tracey, Devon, on May 1st; and when Mr. Mathew and myself were at Slapton Ley, on the south coast, on May 9th, House Martins were in great numbers perched on the

telegraph-wires which run along the sands, and had evidently just arrived from seaward; but none were seen at Exmouth till May 12th.

The observations in 'Birds of Devon,' alluded to by Mr. Warde Fowler, were made by myself, and I append records for thirty-four out of the forty-six years between 1852 and 1897 from my own note-books (made principally in Exeter or its neighbourhood, and at Exmouth); and also notes made by the late Mr. T. R. Archer Briggs at Fursdon, Egg Buckland, Devon, which were very kindly put into my hands by his brother, Colonel Briggs. My observations were unfortunately not continuous, as I was absent from England between 1856 and 1862, and between 1884 and 1888, and from 1867 to 1870, and in a few other years I was too much occupied to record any observations. It is curious to notice that whereas the dates of arrival in this neighbourhood used to be much earlier than those recorded by Mr. O. V. Aplin near Banbury, of late years they are later.

1852, April 7th	
1853, April 12th.....	April 20th, T. R. A. B.
1854, —	
1855, April 25th.....	April 27th, T. R. A. B.
1856, April 14th.....	
1857, —	
1858, —	April 22nd, T. R. A. B.
1862, April 23rd.....	April 24th, T. R. A. B.
1863, April 28th.....	
1864, April 24th.....	
1865, —	April 27th, T. R. A. B.
1866, April 16th.....	
1867, April 14th.....	April 27th, T. R. A. B.
1868, —	
1869, —	
1870, —	
1871, April 19th.....	April 28th, T. R. A. B.; April 17th, Totnes, J. H. G.
1872, April 21st (April 23rd, Tor- quay, J. H. G.)	
1873, April 16th (in large numbers)	April 30th, T. R. A. B.; May 3rd, J. G.
1874, April 2nd and 5th	April 27th, T. R. A. B.
1875, April 10th and 18th	
1876, April 9th (many).....	
1877, April 26th.....	May 4th (Plympton).
1878, April 25th.....	
1879, —	April 25th, T. R. A. B.
1880, April 24th.....	
1881, —	
1882, April 6th	
1883, April 29th.....	
1884, April 13th.....	
1885, —	
1886, —	
1887, —	May 4th, T. R. A. B.
1888, —	April 25th, T. R. A. B.
1889, —	

1890, April 9th (Exmouth)	
1891, May 14th (Exeter)	April 24th (Kingsbridge).
1892, May 5th (Exmouth)	
1893, —	
1894, April 20th (Exmouth)	
1895, May 1st (Bovey); May 9th (Slapton, in large numbers); May 12th (Exmouth)	
1896, May 8th (Exmouth)	
1897, May 3rd (Chagford)	
1898, June 19th (Topsham)	

--W. S. M. D'URBAN (Newport House, near Exeter).

Dr. Saxby and the Breeding of the Turnstone.—The *locus standi* of the Turnstone (*Strepsilas interpres*), in relation to the question as to whether the species has ever been known to breed in the British Islands, has long perplexed me. No authenticated nests and eggs have ever been found, write, in effect, most of the more modern authorities in the ornithological world. And yet Saxby's account of the discovery of a nest and eggs in Shetland is so circumstantial as to make one wonder whether there is anything "behind the scenes" which causes such almost universal scepticism on the point. That indefatigable and intelligent ornithologist observed a female Turnstone on the evening of June 16th "behaving very suspiciously"; he ultimately, after a search extending over two hours, stumbled on the eggs, three in number, which were lying "in a hollow among the stones," the same hollow being "scantly lined with dry grass." That the eggs were fresh is to be inferred from the context at the top of p. 172 in 'The Birds of Shetland,' a copy of which work I have before me. Further, Saxby writes that he "had not the smallest doubt that the eggs were Turnstone's—indeed, *they could have been nothing else.*" On the following morning a man arrived with the two eggs which Saxby had left in the nest overnight to claim the reward offered by the latter—an incident which tends to prove that the Shetlander had no misgivings as to the correct identity of the species. While yet again, after having specifically referred to the fact that he had for years seen Turnstones *in pairs* about the shores of Unst during the *breeding season*, Saxby writes:—"Two of the eggs were a good deal like the figure in Mr. Hewitson's work." Now it seems to me that for writers with almost one accord to declare that it is highly probable that the Turnstone breeds in Shetland and on some of the northern islands, and then summarily to reject Saxby's positive and very explicit account of the discovery of a nest and eggs in Shetland with the remark, "There is no authentic instance of the breeding of the Turnstone in Great Britain" (vol. iii. p. 178, 'British Birds,' Bowdler Sharpe), is a capricious, not to say arbitrary and illogical way of treating the matter. I have nowhere seen it stated that Saxby was not competent to identify a

Turnstone when he saw one, or its eggs; while Seeböhm, with whom I entirely agree, has asserted that "the eggs of the Turnstone cannot be confused with those of any British Plover, nor easily with those of any of the Sandpipers." To my eye, indeed, they have a character peculiarly their own. Edward Newman, by the bye, reviewed 'The Birds of Shetland'—a second notice—in 'The Zoologist' (of which he was then the talented Editor) of November, 1874; but, far from raising a warning voice on the point at issue, he quoted the author's passage dealing with it in full, eulogistically remarking:—"The breeding habits of the Turnstone are admirably described in the paragraph which follows, and leaves nothing to be desired." What I want to know is this: why is Saxby continually quoted with evident approval in this, that, and the other work on British Birds, and yet the same author's detailed version of a question of considerable scientific interest discarded as unworthy of credit? Surely the mere presumptive evidence surrounding the issue strongly favours the complete reliability of the story as Saxby gave it to the world, let alone the personal testimony he adduced in substantial support of it. Permit me to add that I write in no carping spirit; my sole object is quest for information, being unable to account for the *non possumus* attitude adopted by comparatively recent authors in face of some apparently convincing statements on the part of a man who was so punctilious on the score of ornithological accuracy that, though in his own mind he was perfectly satisfied that a couple of eggs brought to him by a boy in 1859 were Turnstone's, he abstained from labelling them as such owing to the inability of the finder to furnish any account either of the bird or nest.—H. S. DAVENPORT (Melton Mowbray).

Late Stay of Swift.—While taking a walk on Lansdown, on Oct. 1st, I saw a Swift amongst a large flock of Swallows and House Martins. I see in the 'Field,' Sept. 24th, that a correspondent noticed a Swift at Wainfleet, Lincolnshire, on Sept. 18th. I do not remember having noticed this migrant prolonging its stay so late as October.—C. B. HORSBRUGH (4, Richmond Hill, Bath).

REPTILIA.

Notes on the Habits of Python molurus in Confinement.—Twelve months ago I became the possessor of an Indian Python (*P. molurus*), which up to the present I have kept in excellent health. During this time I have noticed several things in connection with its habits which are new to me, and which perhaps may be of interest to readers of 'The Zoologist.'

In most accounts of these large reptiles in confinement they are described as being lethargic, and seldom moving. This idea must, I think, arise from their nocturnal habits, and my experience certainly does not

confirm the statement. During the daytime my snake lies quiet, apparently fast asleep. Whether or no he is so I cannot say, but I notice that the elliptic pupil of the eye is generally at this time almost invisible. On touching him, however, the black streak widens until the pupil is large and round, and this I presume means that he is waking up and opening his eyes. However, during the day he seldom moves or takes any notice of what is passing around him; at night he is quite a different animal. He generally wakes up about seven or eight o'clock in the evening, when I see his small head and pearly-white throat peering through the glass front of his case. His movements are restless, quick, and active, and he is rarely still for long together, moving at a fairly rapid pace round the case, and up and down a branch which is placed therein for the purpose of exercise. The pupil at this time is full and round, covering nearly all the eye. His great delight is to be allowed to leave the case and climb about my shoulders, or to have the free run of the room, where he goes on exploring expeditions over chairs, tables, &c., inquisitively examining everything by the aid of his constantly vibrating tongue. Dull-coloured articles which do not shine have not nearly the same attraction for him as those which are brightly polished. The Rev. G. C. Bateman, in his useful book, 'The Vivarium,' expresses the opinion that snakes possess little or no sense of hearing, and my observation certainly confirms this; for, while the Python is exceedingly quick at detecting vibration, he takes not the slightest notice of any sound which is unaccompanied by it, even at times when he is most "wide-awake."

The rate of growth is much more rapid than I should have expected. When I obtained him on Sept. 7th, 1897, he then measured 6 ft. 6 in. in length; on Nov. 29th he had increased to 6 ft. 10 in., and to-day (Sept. 2nd, 1898) he measures 8 ft. 1 in., an increase of nineteen inches for the twelve months. His girth has also considerably increased. During the year he has shed his skin four times. The first was only a few days after I got him, when I noticed him rubbing his head upon the felt at the bottom of the case in order to loosen the skin round his jaws. I have unfortunately lost my notes of the details of the operation, but I remember the time occupied from beginning to end of the proceedings was only twenty minutes, the skin being cast in one piece. Frequently I place in the case a zinc bath filled with water, and in this the Python spends a good deal of time, lying totally immersed, but with the nostrils just above the surface of the water. If disturbed he will withdraw even this, and my friend Mr. F. Grant and myself timed him on one occasion for $5\frac{1}{2}$ minutes before he raised his head to take breath. To this bath he always repairs before casting his skin, and usually passes a considerable time therein on such occasions. On Nov. 20th, noticing that the reptile was listless and

sluggish, and the skin very dry and rough—signs denoting that it was nearly ready to shed—I placed the bath in the case at seven o'clock in the evening. The snake at once entered the water, and did not again leave it until between seven and eleven o'clock in the evening of Nov. 26th, when it shed its skin in the water and left the bath. The skin this time was shed in two pieces. On Jan. 6th the Python again commenced to steep preparatory to casting another skin, and this time remained continuously in the water until Jan. 13th, when it shed its skin (in several pieces) in the water. I was not fortunate enough to see the operation of casting in either of these cases, but on Aug. 10th the snake again entered its bath with a view to softening its skin for casting. This time I kept him under close observation during the whole time. After he had been in the water a day or two the scales over his eyes became white and opaque, and the reptile was evidently blind. In about five days after this occurred they cleared again, and he was able to see, and two days later—on Aug. 19th, at 11.30 p.m.—he left the water. At 11.40 p.m. he commenced rubbing the sides of his jaws on the felt at the bottom of the case, gradually loosening the skin round the edges of the lips. When he had got as far as the nostrils he gave two sudden and forcible expirations of breath—not an ordinary hiss, but more like a sneeze—apparently to clear the skin from the inside of the nostrils, and then continued rubbing off the moist loose skin. At 11.48 p.m. he had the skin completely free from the head, both above and below. At 11.52 p.m., as the snake appeared not to have sufficient room in which to move about, I opened the case and removed the bath. On being thus disturbed he ceased rubbing off the skin, which was now turned back for about six inches behind the head, and lay quiet until 12.10 a.m., when he again commenced. By 12.27 a.m. he had fully two feet of skin removed, and at 1 a.m. three feet. At 1.30 a.m. the tip of his tail came away free from the old skin, which was shed all in one piece, but with one or two small rents in it. During the last half-hour I assisted the process by allowing the Python to crawl through my partially closed hands, as he appeared to feel the need of something against which to rub himself.

As a pet, the Indian Python has many qualifications to recommend him. He is clean in his habits, has no objectionable smell, is easy to feed and keep in good health, and (if my specimen may be taken as a fair example) is easily tamed. Mine is an exceedingly gentle animal, appearing to thoroughly enjoy being handled and petted; and, although his intelligence is not of a very high order, he can readily distinguish between myself and a stranger, from whom he shrinks with evident suspicion, whilst coming to me without hesitation.—W. J. CLARKE (44, Huntriss Row, Scarborough).

PISCES.

Short Sunfish near Scarborough.—On the afternoon of Sept. 4th I was with a party of friends in a boat about two miles from land, off Cloughton Wyke, a small rocky cove five miles north of Scarborough. The day was very hot, with no wind and a calm sea. We saw coming along with the current, and perhaps a quarter of a mile distant, a tall black object showing above the surface of the water, moving somewhat rapidly from side to side, and never disappearing beneath. On gently paddling the boat towards it, we saw that it was a Short Sunfish, and, moving very carefully, it allowed us to bring the boat up within three feet of it, and drift alongside while we watched it. It was moving at the rate of about four miles an hour with the help of the current, at the same time steadily paddling with its large fins. Perhaps the fact that the uppermost of these was almost entirely out of water accounted for the fact that its position was lop-sided instead of straight, and at first it gave us the impression of an injured fish. The means of propulsion appeared to be entirely confined to the two large fins, with which it sculled itself along by alternate movements. So far as we noticed, the pectoral fins and tail were not used. The fish showed no signs of fear until we touched it, when it darted, at an astonishing speed for such an awkward-looking creature, across the bows of the boat. On striking it with a "gaff" it struggled powerfully, diving downwards, and was with difficulty secured. Out of the water it lived only a very short time, and changed its colour in a very remarkable manner as it died. While in the water, and immediately after being taken out, the general colour was very dark brown, almost black, with bright silver streaks and spots. The belly was silvery. After being out of the water about three or four minutes all the dark colour faded, leaving the fish a uniform bright silver. In a few minutes the dark colour gradually returned, until the fish was its normal colour, after which it slowly faded again to plain silver, and remained so. It groaned piteously as it lay in the bottom of the boat, much like a Gurnard, but not quite so loud. The fish weighed about 20 lb., and was 31 in. from tip to tip of the large fins, and 21 in. in length from nose to tail. It was infested with no fewer than three distinct varieties of parasites—*Lernæa branchialis* on the gills, a large round flat parasite about one inch in diameter on the belly and sides, and a smaller one with a long tail on the same part. On dissection the stomach contained a quantity of yellowish fluid, but nothing recognizable. A week later I saw a small specimen of the same species in a local fishmonger's shop, which the manager said had been taken at Scarborough, but I could get no details as to the exact locality and date.—W. J. CLARKE (44, Huntriss Row, Scarborough).

ARACHNIDA.

Asagena phalerata at Grasmere.—It may interest your readers to hear of a recent capture of *Asagena phalerata*. This spider is certainly not common in the North-west of England; it was recorded by Blackwall as rare in Denbighshire, and by Mr. Cambridge as rare in Dorset. I found a mature male on Aug. 3rd or 4th, at the top of Redbank, above Grasmere. Its habitat is said to be amongst heather and stones, but this specimen was in a patch of grass beneath a rock, and close to a tiny fine sheet of web. The grass was glistening with dew in the early morning sun, and several of these small snares sparkling with specks of moisture attracted my attention, but the spiders were easily lost in the herbage, and only one rewarded my search. The species is a very distinct one, and seen upon the ground might be mistaken for a small beetle at a hasty glance. The length is just three-sixteenths of an inch. The cephalo-thorax is a dark red-brown colour, broad behind, and quite narrow at the caput; it is slightly overhung by the flattened oval abdomen. This is a very deep black-brown, somewhat glossy; on the fore part is a narrow yellowish white crescent mark, and half-way between this and the spinners on either side is a short vivid white line, slightly curving back, and in the centre just above the spinners is a longer bisected white line. The legs are short and strong, of the same colour as the cephalo-thorax, and are ringed with black at most of the joints. The palpi are short and thick, and the palpal organ a complicated knob.—HENRY W. FRESTON (Kersal, Manchester).

Epeira diadema Courtship.—On Sept. 5th I made a close observation of the courtship of a fine pair of *Epeira diadema*. Some days ago the female spun a large web in a corner by my front door here, and on two mornings I had watched the efforts of a male to win her good graces. She fiercely repelled, however, all his advances. But on the morning of the 5th her humour had changed. A male crept down the wall until he reached a radius of the web. He cautiously advanced along this while she hung motionless in the centre of the web. When he reached the orbicular lines he vibrated the web with his fore legs, and also waved these up and down several times; he then went back to the wall. This he repeated several times, till the female set off slowly towards him. He waited on the line by the wall till she came to the edge of the snare and poised herself upon the line on which he had travelled; she seemed to hang down attached by all her feet to the line. He then carefully approached on the upper side of the line, waving his fore legs slowly up and down; then he backed away, then advanced, always coming nearer at each repetition. At last he was actually waving his legs over her head, and still she did not move. It seemed as if he wished to mesmerize her. He ran back to the

wall, and waited a second or two ; then most resolutely he ran to her again without any precaution at all, grasped her with his fore feet, and appeared to press both palpal organs upon the region of her genital aperture. They remained motionless in this position fully half a minute. He then withdrew very slowly indeed towards the wall, and there suspended himself by a single line of about three inches. He seemed to be dying, and I thought she had bitten him. However, in five minutes he revived, and went off to the niche in the wall whence he had first come. She meanwhile awoke, and returned to her usual place in the centre of her web. I hope to record the date when the eggs thus fecundated are deposited. In the same connection, I may mention that in another part of my little garden I have just seen two males captured and devoured by females of this species ; but in neither instance did it seem to me that the male thus caught was on amorous purpose bent. Once certainly he had dropped from above into the web accidentally, and he was unable to extricate himself before he was attacked and swathed in silk.—HENRY W. FRESTON (Manchester).

INSECTA.

Jumping Beans.—I do not know whether your pages are open to discussion, but if they should be, I should like to invite an explanation as to the method by which a perfect insect, imprisoned under certain conditions as a pupa, liberates itself on emerging from that state. At the World's Fair at Chicago, and subsequently last summer at Earl's Court, certain seeds of a Mexican Euphorbiaceous plant were sold under the designation of "Jumping Beans." These seeds, if placed in a warm hand, or subjected to sunshine or a higher temperature, would move, or jump with short jerks, and by some people who knew nothing of their nature were considered "wonders" and "uncanny." They were sold at a considerable price at Chicago, and at a fair and reasonable price at Earl's Court. Of course the solution was evident to anyone who knew anything about lepidopterous larvæ, namely, that they enclosed some internal feeding larva. I procured a few for observation in June, 1857 ; and in September, 1858, three *Tortrix* moths (*Carpocapsa*, I believe) emerged. The problem I want to solve is, how do these imago forms find their exit from the extremely hard and tough walls of the seed in which they have been enclosed, so tough and hard that it requires a very sharp knife to cut through them ? The aperture through which the small moth escapes is a perfect cylindrical hole, as true as if bored by an instrument. In two of the cases in which the perfect insect came forth I found the empty pupa-case lying clear of the seed capsule. In a third case the pupa protruded about half its length through the aperture, and was dead, apparently wanting strength to effect its exit. Now how is this circular aperture, by which the moth escapes,

formed? Has the imago or the pupa the power of secreting some fluid that decomposes the wall of the seed; but if so, how is it that the aperture is so perfectly true in its circular form? This aperture is never visible until the imago or pupa has emerged. The seeds remain externally intact up to that time. It occurred to me that the larva, before going into the pupa state, might possibly prepare an exit for the imago by eating partly through the wall, but not so far as to break through altogether. With a view to ascertain this, I have just opened a seed, and find a perfect pupa, and no sign of the interior of the walls having been eaten away, as I conjectured above; and besides, if such preparatory boring, as I conjectured, had occurred, this would have involved intelligence on the part of the larva, which one can hardly suppose. The subject, I think, is an interesting one, and I hope that some of your entomological readers will throw some light upon it.—W. OXENDEN HAMMOND (St. Alban's Court, near Wingham, Kent).

[See 'Entomologist,' 1895, 1896, and 1897, and especially a paper by Dr. Sharp "On Jumping Cocoons from South Africa," Entom. November, 1896.—ED.]

NOTICES OF NEW BOOKS.

A Classification of Vertebrata, Recent and Extinct. By HANS GADOW, M.A., Ph.D., F.R.S. Adam and Charles Black.

THIS volume, written by a well-known Cambridge zoologist, appeared opportunely a little before the meeting of the Zoological Congress at that University town. It is a classification of the Vertebrata based on the sound foundation of that which preceded as well as that which exists. It of course naturally follows that the osseous structure is all that we certainly know of the past vertebral life, though Dr. Gadow argues "it would be pedantic to exclude all soft perishable parts on the plea that they are unknown in the fossil forms. Here discretion is to be used. We do not 'know' that the palæozoic Fishes did possess an entirely venous heart, nor has it yet been shown that the embryos of Dinosaurs were surrounded by an amnion; but we feel nevertheless certain, because of the laws of correlation which comparative anatomy allows us to deduce from the study of recent creatures." This proposition will be generally accepted, and is distinct from the question of antecedent colouration, a subject still in the domain of probabilities. This method will perhaps be best exemplified by reference to our own relationships, which Dr. Gadow thus arranges:—

"**ANTHROPOIDÆ.**—Caudal vertebræ transformed into a coccyx.
Walk erect or semi-erect.

Hylobates.—S.E. Asia. 'Gibbon.'

Pliopithecus.—Miocene of Europe.

Simia satyrus.—'Orang Utan.' Sumatra and Borneo.

Troglodytes gorilla and *T. niger*.—West Equatorial Africa.

T. sivalensis.—Pliocene, Punjab.

Dryopithecus.—Miocene, France.

Pithecanthropus erectus.—Plistocene, Java.

Homo sapiens.—Cosmopolitan."

After the classification of the Vertebrata, a digest is given of their geographical distribution. Then follows an approximate number of recent species of vertebrates, giving a total of 24,241 species.

There is a concluding and original note which we reproduce. "Supposing the fauna of the world was reduced to the 250th part of living species, then the Primates would be represented by *one* species only, and this being of course Man, his available menagerie would consist of scarcely threescore species, half of which would be Teleostean Fishes. The rest would be composed of a dozen and a half of Singing-birds; half a dozen each of Lizards and Snakes; four Rodents; four non-singing Neotropical Passerine Birds; two species each of Woodpeckers, Humming-birds, and Bats; one or two each of Parrots, Pigeons, Fowls and some other Game-birds, Kingfishers, and Birds of Prey; and one species each of a Shark, Frog, Toad and Tree Frog, Gecko, Ruminant, and Carnivore."

The Trout. By the MARQUESS OF GRANBY. With chapters on Breeding by Col. F. H. CUSTANCE; Cookery by ALEXANDER INNES SHAND. Longmans, Green & Co.

THE Trout has followed the Salmon as subject-matter for a new volume in the Fur, Feather, and (now) Fin Series; and although the capture of the fish occupies a large portion of the work, its natural history is not altogether neglected. It is indeed difficult to read any good book on angling without acquiring some knowledge as to the habits of fish; in fact, it is such knowledge that makes a successful angler. To many naturalists, again, the angler's description of Trout "tailing" and "bulging" will prove a most interesting narrative. "Tailing is a performance frequently witnessed in Hertfordshire and Buckinghamshire waters, and in South-county streams generally. As may be surmised, the phrase 'tailing Trout' means that the fish are plunging their heads into the weeds, or poking about on the bottom of the river, seeking their food amongst the freshwater shrimps, grubs, and similar appetizing morsels; and in comparatively shallow streams this downward operation causes the fishes' tails to appear above the surface of the water." "Bulging" is the explanation of what to the fisherman will sometimes seem

"innumerable rises." "On closer inspection these will prove to be fish taking what I believe are called the *nymphæ* of the Duns or Mayflies just before they reach the surface, there to hatch out."

Col. Custance deals somewhat exhaustively with Trout-breeding. "The three principal breeds of freshwater Trout raised by the British fish-culturist are the English Brook Trout (*Salmo fario*), the Loch Leven Trout (*S. levenensis*), and last, but not least, the Rainbow Trout (*S. irideus*). The first is the one used for general stocking purposes in this country; *S. levenensis*, although a lake Trout, will also thrive in rivers where there is a considerable depth of water; but Col. Custance gives his vote for the Rainbow Trout, which originally came from America. He describes it as almost satisfying "the Trout-breeder's ideal of perfection." "A splendid surface feeder, he will readily accommodate himself to new water, and will, under favourable conditions, grow with extraordinary rapidity and to a great size." *S. irideus* has a common frailty of the Salmonidæ in a propensity to cannibalism, but he is considered to have less of that quality than *S. fario*, but this is owing to the Rainbow Trout having the smaller mouth.

We may say that the authors of this little volume are anglers among naturalists, and naturalists among anglers.

EDITORIAL GLEANINGS.

WE have received the Report of the South African Museum for 1897. The principal event was the opening of the new museum building on April 6th, the old building having been closed to the public on January 19th. The number of additions to the collection is very satisfactory, as the following details prove :—

	SPECIMENS.			SPECIES NEW TO THE MUSEUM.		
	South African.	Exotic.	Total.	South African.	Exotic.	Total.
Mammals	64	8	72	6	4	10
Birds	89	0	89	7	0	7
Reptiles and Amphibia	335	2	337	8	1	9
Fishes	4	0	4	0	0	0
Tunicata	0	9	9	0	7	7
Mollusca	370	5	375	15	0	15
Insecta	2289	20	2309	122	0	122
Chilopoda	180	0	180	15	0	15
Diplopoda	245	0	245	29	0	29
Protracheata	2	0	2	0	0	0
Arachnida	1124	0	1124	11	0	11
Crustacea	1456	0	1456	51	0	51
Vermes	178	0	178	13	0	13
Total	6336	44	6380	277	12	289

The Director, Mr. W. L. Sclater, reports :—“ The general state of the collections is satisfactory. The new cases are completely dust-proof, and, as far as can be seen at present, seem to be quite insect proof; any incipient attacks of museum pests can be easily dealt with by the introduction of a saucer of carbon bisulphide into the case, the fumes of which at once destroy any living matter.”

In Mr. L. Péringuay's report on the Department of Entomology we read :—“ The most interesting discoveries of the year have been the existence of a representative of the curious family Embiidæ of the order Neuroptera (gen. ? *Oligotoma*) not before recorded in South Africa; and the curious parallelism of some coleopterous forms inhabiting the Cape and the Canary Islands, as exemplified by captures made by Mons. A. Raffray

in the immediate vicinity of Cape Town. He has lately discovered a species of *Metophthalmus* (family Lathrididæ), three species of which are represented in the Canary Islands; he has also discovered an eyeless species of weevil (nov. gen.) and another (gen. ? *Pentatemenus*), the eyes of which have only six facets. These insects belonging to the subfamily Cossoninæ are very closely allied to similar ones occurring in the Canary Islands, and which are also found in the extreme South of Europe. Wollaston, as far back as 1861, described a Colydid (gen. *Cossyphodes*) from the Cape belonging to a genus known at the time as occurring only at Madeira. Another species was later on discovered in Abyssinia. It is a singular coincidence that both *Cossyphodes* and *Metophthalmus* should be discovered in such opposite directions. The true explanation is that the minute insects of Africa have not yet been properly collected, and that the genera mentioned above will be found to have a larger area of distribution than at first imagined."

Another very interesting record is found in Mr. Gilchrist's report on Marine Invertebrates:—"The specimen identified as *Astacus capensis* is of special interest, particularly as it is the only known representative of the European Lobster in South Africa. It is described by Herbst as being found in the rivers of the Colony, and as having all five pairs of legs chelate. The specimen procured was, however, found in a salt-water rock pool (at Sea Point), and others in the museum collection are described as from Algoa Bay. Moreover, all the legs are not chelate in these specimens. These points will receive special attention, as there is evidently an error somewhere."

THE following extracts are taken from an article "By a South Sea Trader" in the 'Pall Mall Gazette' of July 12th:—

Twofold Bay, a magnificent deep-water harbour on the southern coast of New South Wales, is a fisherman's paradise, though its fame is but local, or known only to outsiders who may have spent a day there when travelling from Sydney to Tasmania in the fine steamers of the Union Company, which occasionally put in there to ship cattle from the little township of Eden. But the chief point of interest about Twofold Bay is that it is the rendezvous of the famous "Killers" (*Orca gladiator*), the deadly foes of the whole race of Cetaceans other than themselves, and the most extraordinary and sagacious creatures that inhabit the ocean's depths. From July to November two "schools" of Killers may be seen every day, either cruising to and fro across the entrance of the bay, or engaged in a Titanic combat with a Whale—a "Right" Whale, a "Humpback," or the long, swift "Finback." But they have never been known to tackle the great Sperm Whale, except when the great creature has been wounded by

his human enemies. And to witness one of these mighty struggles is worth travelling many a thousand miles to see; it is terrible, awe-inspiring, and wonderful.

The Killer ranges in length from 10 ft. to 25 ft. (whalemen have told me that one was seen stranded on the Great Barrier Reef in 1862 which measured 37 ft.). They spout, "breach," and "sound" like other Cetaceans, and are of the same migratory habits as the two "schools" which haunt Twofold Bay, always leave there about November 28th to cruise in other seas, returning to their headquarters early in July, when the Humpback and Finback Whales make their appearance on the coast of New South Wales, travelling northwards to the breeding-grounds on the Brampton Shoals, the coast of New Guinea, and the Moluccas.

The whaling station at Twofold Bay is the only one in the Colony—the last remnant of a once great and thriving industry. It is carried on by a family named Davidson, father and sons, in conjunction with the Killers. And for more than twenty years this business partnership has existed between the humans and the Cetaceans, and the utmost rectitude and solicitude for each other's interests has always been maintained—*Orca gladiator* seizes the Whale for Davidson, and holds him until the deadly lance is plunged into his "life," and Davidson lets *Orca* carry the carcass to the bottom, and take his tithe of luscious blubber. This is the literal truth; and grizzled old Davidson or any one of the stalwart sons who man his two boats will tell you that but for the Killers, who do half of the work, whaling would not pay with oil only worth from £18 to £24 a tun.

When the men have done their part, comes the curious and yet absolutely truly described part that the Killers play in this ocean tragedy. The Killers, the moment the Whale is dead, close round him, and fastening their teeth into his body, bear him to the bottom. Here they tear out his tongue, and eat about one-third of his blubber. In about thirty-six to forty hours the carcass will rise again to the surface, and as the spot where he was taken down has been marked by a buoy, the boats are ready waiting to tow him ashore to the trying-out works. The Killers accompany the boats to the heads of the bay, and keep off the Sharks, which otherwise would strip off all the remaining blubber before the body had reached the shore.

The Killers never hurt a man. Time after time have boats been stove in or smashed into splinters by a Whale and the crew left struggling in the water to be rescued by the "pick-up" boat; and the Killers swim up to them, look at—ay, and *smell* them—but never touch them. And wherever the Killers are, the Sharks are not, for Jack Shark dreads a Killer as the devil dreads holy water. "Jack" will rush in and rip off a piece of blubber if he can, but he will watch his chance to do so.

Sometimes when a pack of Killers set out Whale-hunting they will be joined by a Thresher—the Fox Shark (*Alopias vulpes*), and then while the Killers bite and tear the unfortunate Cetacean, the Thresher deals him fearful blows with his scythe-like tail. The master of a whaling vessel told me that off the north end of New Caledonia there was a pack of nine Killers which were always attended by two Threshers and a Swordfish. Not only he but many other whaling skippers had seen this particular Swordfish year after year joining in attacks upon Whales. The cruising ground of this pack extended for thirty miles, and the nine creatures and their associates were individually known to hundreds of whalers. And no doubt these combats, witnessed from a merchant ship, have led to many Sea Serpent stories; for when a Thresher stands his long twenty feet of slender body straight up on end like a pole, he presents a strange sight. But any American sperm-whaling captain will wink the other eye when you say "Sea Serpent."

SOME Smelts have been caught in the Thames at Kew and Richmond. They were taken by anglers fishing with gentles for Roach and Dace. Last year Smelts worked as high up the Thames, and their presence there is of considerable interest, as it testifies to the increasing purity of the river.—*Westminster Gazette*, August 15th.

A SOCIETY with the title of the Zoological Society of Edinburgh is being formed for the purpose of establishing a zoological garden. A public meeting was to be held early in October.

To protect the water-fowl and wild birds at Hampstead Heath some very pretty plantations have been made by the County Council near the ponds, and fenced in so as to keep the public from them. One result of this additional security is that there are now several broods of Cygnets, Wild Ducks, and Moorhens in the ponds. According to the keepers the wild fowl have trebled in number during the present year.

MR. LIONEL E. ADAMS has contributed "A Plea for Owls and Kestrels" in the 'Journ. Northamptonshire Nat. Hist. Soc.' for June last. The author rightly observes:—

The simple and direct test is the analysis of the "pellets" which these birds cast up. Many people (including a keeper that a friend of mine recently interviewed) are not aware that Owls, Hawks, and many other

birds swallow their prey whole if small enough, or in lumps—fur, bones, feathers, everything together ; and that after the flesh and nutritious juices have passed into the system, the indigestible bones, &c., are disgorged in masses usually known as “ pellets.” In Northamptonshire they are termed “ quids,” in Staffordshire, Derbyshire, and Cheshire “ cuds,” in Cambridgeshire “ plugs,” and in Lancashire and Cheshire they sometimes go by the suggestive name “ boggart muck.” This curious term doubtless originated from the fact that pellets are sometimes found in church towers and churchyards, and the mysterious hootings and screechings heard at night in these places give colour to the notion that “ boggarts ” (ghosts) are engaged upon their unhallowed feast !

These pellets contain, as stated, the bones of the animals preyed upon, usually in an almost perfect condition, the little skulls being perfectly easy to identify by a competent osteologist. It is still less generally known that many other birds eject similar pellets, *e. g.* the Swallow tribe, Herons, Gulls (and probably most sea-birds), Flycatchers, and Rooks. Rooks’ pellets, by the way, may be found beneath the nests while the young are being fed, and never, I think, at other times, and I fancy they are composed of the indigestible portions of the food which the parent Rooks prepare for their young in a way similar to that peculiar to Pigeons.

I have carefully analysed and kept a record of many hundreds of Owls’ pellets from or close to estates where game is reared, and from many parts of England and Ireland, at the time of year when Pheasants and Partridges are young and least able to take care of themselves ; and I can positively assert that *in no case have I ever found the remains of any game bird, chicken, or duckling.* I once mentioned my experience to the late Lord Lilford, and that great authority informed me that his experience entirely tallied with mine.

It is impossible for us with due regard to our space to give the whole of Mr. Adams’s statistics ; the following are examples :—

If not molested, Owls will take up their abode near a farm and keep the Rats and Mice under much more effectively and cheaply than a professional Rat-catcher. Only last spring, close to a Derbyshire farm, I found within a fortnight fresh pellets containing :—Brown Rats, 62 ; Long-tailed Field Mice, 38 ; Common Shrews, 16 ; Short-tailed Field Mice, 5 ; Bank Voles, 10 ; Water Voles, 2 ; Frogs, 6 ; Toads, 2 ; Beetles, several : total, 141. And all this was due to (I think) a single pair of Long-eared Owls.

The first two of the following analyses are from pellets in old deserted Pigeon cotes in farm buildings near Stafford. In both cases the farmers protected and encouraged the birds. The third is from a nest in a hollow oak in Rockingham Park, Northants :—

Locality.	No. of Pellets.															Total No. of Animals.		
	Mole.	Common Shrew.	Lesser Shrew.	Water Shrew.	Long-tailed Field Mouse.	House Mouse.	Brown Rat.	Short-tailed Field Mouse (Field Vole)	Bank Vole.	Water Vole.	Rabbit.	Frog.	Sparrow.	Thrush or Blackbird.	Starling.	Other small Birds.		
Kinvaston Hall...	260	—	113	4	5	219	7	41	241	63	1	—	1	13	—	12	720	
St. Thomas' Farm	520	1	87	12	12	252	8	100	259	9	7	—	2	35	18	4	33	839
Rockingham Park	135	1	77	10	4	100	5	40	190	32	2	1	1	4	1	—	3	472
Rockingham Park	82	1	67	1	—	57	1	18	94	23	—	3	7	1	—	2	275	

The analysis of the Kestrels' pellets likewise determines its usual food, though, as these pellets are not found in quantities together, like those of Owls, but here and there sparingly, the same amount of certainty cannot be guaranteed. Most of those that have come under my personal notice have been composed entirely of the wing-cases of all sorts of beetles and the wings of flies, and sometimes the remains of a small Vole or Mouse, but I have never discovered the remains of birds or Rabbits. Indeed the bird is hardly large enough to attack the latter successfully, though a gamekeeper giving evidence before the Vole Plague Committee says:—"I have also seen one lift a young Rabbit." Whether "lift" is used in the Scotch sense of "carry off," or merely to "raise from the ground," does not appear; but the fact is unimportant in any case, and the Committee rightly came to the conclusion that "the food of this bird is known to consist almost exclusively of Mice, Grasshoppers, coleopterous insects and their larvæ."

PROF. ALEXANDER AGASSIZ, after serving the Museum of Comparative Zoology at Cambridge, Massachusetts, for thirty-five years, has resigned his position as Director and Curator. Dr. W. McM. Woodworth has been appointed Assistant in charge of the Museum.—*Athenæum.*

THE Society for the Biological Exploration of the Dutch Colonies has organized a scientific expedition to Java, which is to start next October under the direction of Dr. Max Weber, Professor of Zoology at Amsterdam. The object of the expedition, which is to last about a year, is the zoological, botanical, and oceanographical exploration of the seas of the Indian Archipelago.

MR. F. G. AFLALO, writing to the 'Times' from Mevagissey, Cornwall (August), states:—

Sharks positively swarm just now in the 20-fathom water between Plymouth and the Land's End. I have been catching both the Blue and

Por-beagle up to 40-lb. weight, and have lately had the former species round my boat to a length of close on 5 ft., a dangerous size. I am, however, induced to publish this warning by the fact that on Wednesday a young fisherman of this place, dangling his hand over the side in manipulating his Mackerel lines, had the sleeve of his shirt torn to the elbow by one of these surface prowlers. Folk who acquire most of their knowledge of sea-fish in the metropolis are given to doubt the presence of true Sharks in the Channel, preferring to regard them as Dog-fish. May I give them my assurance, for what it is worth, that these are but two of several true British Sharks; that they are, as proved by the aforementioned episodes, both large and aggressive, and that they are most in evidence on those calm hot days that chiefly attract the bather.

FEW zoologists are unfamiliar with the name of the publisher, John Van Voorst, who died on the 24th July, after a long and successful life, having been born as early as February 15th, 1804. He belonged to an ancient Dutch family which had settled in England several generations ago. He was apprenticed to Richard Nicholls, of Wakefield, somewhere about 1820, and, after passing some years with the Longmans, began business on his own account in 1835, in Paternoster Row. After publishing fine illustrated editions of such works as Gray's 'Elegy,' Goldsmith's 'Vicar of Wakefield,' &c., he turned his attention to the union of artistic execution with scientific publications, and 1835 saw the commencement of Yarrell's 'British Fishes,' followed by Bell's 'British Quadrupeds' in 1836, Yarrell's 'British Birds' in 1837, and a series of recognized classics on British Crustaceans, Zoophytes, Starfishes, &c. As specimens of wood-engraving, the cuts by Sam Williams and John Thompson in Selby's 'British Forest Trees' (1842) show the perfection attained in an art now less practised; while the illustrations to Yarrell's 'British Birds,' including the vignettes, show how nearly black-and-white can indicate colour. After a long and prosperous career, Van Voorst retired from business in favour of his assistants, Messrs. Gurney & Jackson, in 1886; but his genial interest in old friends and a younger generation of naturalists never flagged until, on the completion of his ninety-fourth year, the exhaustion of natural forces began to make itself apparent. For many of the above facts we are indebted to the obituary notice which appeared in the 'Athenæum.'

